ABSTRACT

A dual-mode acoustic wave resonator (7a) having a resonance mode inter-coupler (6) is disposed across narrow voids (4, 5) from an input electrode (2) and an output electrode (3). They are supported for vibrations on a substrate by conductive posts (27, 28, 29) and a power supply pad (3). Opposing electrodes (10, 11, 21, 23) are formed below the input and output electrodes (2, 3), resonator (7a), and resonance mode inter-coupler (6) across narrow gaps. As a voltage of a power supply (25) is changed, a distortion of the resonator (7a) changes due to an electrostatic force, causing a change in the center resonance frequency. As voltages of power supplies (16, 17) are changed, distortions of the input and output electrodes (2, 3) change to cause a change in the opposing areas of end faces of the input and output electrodes to the resonator (7a). This causes a change in the situation of exchanging energy between the input and output electrodes and the resonator (7a) to change the external Q-value. As the voltage of the power supply (25) is changed, a distortion of the inter-coupler (6) changes to cause a change in the coupling coefficient between the resonance modes.